

CHRISTOPHER ESTERHUYSE

Software researcher and programmer, focusing on system communications, control, and all kinds of analysis

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WORK EXPERIENCE

PhD Candidate: Researcher and Lecturer

University of Amsterdam (Complex Cyber Infrastructures Group)

April 2021 – April 2025

Amsterdam, The Netherlands

Funded by the AMdEX fieldlab project, researched and developed generic and robust data exchange and computation systems via formal methods and multi-agent systems techniques. Lectured, evaluated, and coordinated for the programming languages bachelor's course, and supervised 5 students' thesis projects. Arranged social and research events as a member of the CCI research group, and on the council of the IPA research school.

Scientific Programmer

Centrum Wiskunde & Informatica (Computer Security group)

October 2019 – November 2020

Amsterdam, The Netherlands

Main developer on the Reowolf project, funded by the NLNet foundation. Developed a middleware that realises low-level, multi-party network sessions, controlled by decentralised users at runtime via high-level, synchronous, Reo-like protocol specifications. The project deliverables include the Rust source code, final presentation, and technical report.

Research Intern

Centrum Wiskunde & Informatica

2017 & 2019

Amsterdam, The Netherlands

- **Formal Methods group** January 2019 – August 2019
 MSc thesis: developed a backend for the Reo compiler, generating multi-threaded Rust code that efficiently executes the given Reo protocol.
- **Bioinformatics group** April 2017 – July 2017
 BSc thesis: implemented and benchmarked a stage of a viral genome assembly pipeline, using a recent, optimised string-matching algorithm.

Teaching Assistant

Vrije Universiteit Amsterdam

Part time 2015 – 2018

Amsterdam, The Netherlands

Assisted in four bachelor courses. Topics included C++ and Java programming, IOT devices, logic, set theory, and automata theory. Responsibilities included 1-on-1 and group student assistance, and grading assignments and exams.

PUBLICATIONS

- We give a new semantics and interpreter to the eFLINT policy language, thus clarifying its semantics and enabling model-checking.
- We formalise Reowolf's synchronous and multi-party protocol language, prove key properties, and characterise its correct interpreters.
- We characterise specification languages enabling controlled, multi-party development, and demonstrate extensions of eFLINT, Alloy, and Datalog.
- We define a framework for systems of autonomous agents that preserve action-policy compliance, all the while taking actions and changing policy.
- We retro-fit an existing, distributed, medical-data workflow processing system with a mechanism for runtime enforcement of eFLINT policies.

EDUCATION

PhD Computer Science (expected)

University of Amsterdam

April 2021 – March 2025

Thesis title: Cooperative Control of Multi-Agent Systems via Dynamic Specifications

MSc Parallel and Distributed Computer Systems

Vrije Universiteit Amsterdam

September 2017 – August 2019

Cum laude. GPA: 9.1. Thesis grade: 9.5

BSc Computer Science

Vrije Universiteit Amsterdam

September 2014 – August 2017

Cum laude. GPA: 8.9. Thesis grade: 10.0

TECHNOLOGIES

More: Alloy C Coq Git Haskell
Java Python Rust LaTeX
Less: C++ Chapel Docker Erlang
Go Lean Maude R Scala

SIDE PROJECTS

- Slick interpreter**
Deterministic interpreter of Slick, a reflective, logical, meta-specification DSL.
- Terracing**
Ink-style topological map generator.
- Common image source identification**
 Benchmarked high performance image processor in Chapel.
- Sequents**
 Homemade model-checker of first-order modal logic sequents.
- Bowgame**
Networked multiplayer archery game, implemented atop the GGEZ engine.
- Conit Glowstone**
 Fork of the Minecraft Glowstone server, dynamically scaling consistency via the conit model of Yu et al.